

## CLAIMS

### What is claimed is:

1. A method for preparing a high density oligonucleotide array on a solid support, said method comprising the following steps:
  - a) providing a solid support having a surface comprising functional groups;
  - b) attaching an activated nucleotide to said functional group in the presence of an activator;
  - c) repeating said step of attaching an activated nucleotide to form an oligonucleotide array having at least 100 different oligonucleotides /cm<sup>2</sup>.
2. A method for preparing a high density oligonucleotide array according to claim 1 wherein said array has at least 500 different oligonucleotides /cm<sup>2</sup>.
3. A method for preparing a high density oligonucleotide array according to claim 1 wherein said array has at least 1000 different oligonucleotides /cm<sup>2</sup>.
4. A method for preparing a high density oligonucleotide array according to claim 1 wherein said array has at least 5000 different oligonucleotides /cm<sup>2</sup>.
5. A method for preparing a high density oligonucleotide array according to claim 1 wherein said array has at least 10,000 different oligonucleotides /cm<sup>2</sup>.
6. A method according to claim 1 wherein said activated nucleotide is a phosphoramidite.
7. A method according to claim 1 wherein said phosphoramidite is located at the 3' hydroxyl group of a nucleotide
8. A method according to claim 6 wherein said phosphoramidite further comprises a photo protecting group.
9. A method according to claim 8 wherein said photo protecting group is selected from the group consisting of NVOC, NPOC, MeNVOC, and MeNPOC.
10. A method according to claim 9 wherein said photo protecting group is MeNPOC.
11. A method according to claim 1 wherein said activator is selected from the group consisting of 4,5 dicyanoimidazole, 1-H-tetrazole, ethylthiotetrazole, a pyridinium salt, and mixtures thereof.
12. A method according to claim 1 wherein said activator is selected from the group consisting of ethylthiotetrazole, pyridinium trifluoroacetate, and mixtures thereof.

13. A method according to claim 1 wherein said activator is ethylthiotetrazole.
14. A method according to claim 1 wherein said activator is pyridinium trifluoroacetate.
15. A method for preparing a high density oligonucleotide array on a solid support, said method comprising the following steps:
  - a) providing a solid support having a surface comprising functional groups;
  - b) attaching a phosphoramidite nucleotide to said functional group in the presence of ethylthiotetrazole;
  - c) repeating said step of attaching an activated nucleotide to form an oligonucleotide array having at least 100 different oligonucleotides /cm<sup>2</sup>.